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ABSORPTION OF IMMUNOGLOBULINS IN THE COLOSTRUM BY ARTIFICIALLY-NOURISHED LAMBS

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Abstract: The purpose of this study was to investigate the body mass and the immune state of the lambs raised in natural conditions and artificial feeding conditions with two different quantities of colostrum. In this study, 60 lambs were randomly divided into groups according to treatment: 20 lambs remained with their mothers (the natural growth group G1), 20 lambs were taken from their mothers post-partum and were fed from the bottle with 150 g of collection milk (G 2) equivalent of 4g of IgG, and 20 lambs were fed with 200 g colostrum (G3) equivalent of 8 g IgG. The total colostrum amount was equally divided into three rations 2, 14, and 24 h post-partum. Naturally raised lambs (G1) had a larger body mass than G2 and G3 during breastfeeding, while G2 and G3 had a larger body mass than G1 upon weaning. G3 and G1 had plasma concentrations of IgG higher than G2 during breastfeeding. G2 and G3 presented similar concentrations of IgG, but higher than G1 lambs. The lambs that were breastfed with 200 g colostrum (8 g of IgG/kg) presented immune values similar to those of the lambs grown in natural conditions, with a higher weight. This proves that not only the amount of colostrum, but also its management during the separation of the mother, the quality of the milk, and the frequency of breastfeeding can affect the final immune status of the lambs. Regarding the study of factors influencing the absorption of colostrum immunoglobulins from recently-born lambs, 60 lambs belonging to the Turcană breed were separated from their mothers before breastfeeding and fed with the bottle with 10 measures of colostrum from their mothers and 10 from colostrum collection.

• Introduction

The relationship between colostrum and the survival of newly born lambs has been characterized for a long time. In fact, colostrum contains a complex mixture of proteins that actively participate in the protection of newly born lamb by passive immune transfer (PIT) against pathogens and other post-partum environmental challenges. Moreover, colostrum has various components, such as fat, lactose, vitamins, or minerals that have an important high nutritional level. In particular, colostrum plays an important role in lambs because they are hypogammaglobulinemic because of the complexity of the placenta in ruminants, which is syndesmoepithelial, which does not allow sufficient transfer from mother to foetus. In addition, it has been described that lambs who did not benefit from colostrum in the first hours of life are more susceptible to diseases and mortality. Nowadays, there is an increase in the number of highproduction dairy farms, where the lambs are raised in an artificial feeding system. In such cases, the lambs are fed with colostrum bottle then with milk replacement to increase the amount of milk available for processing.

• Results and discussion

To determine the plasma concentrations of IgG, the samples were sent to a laboratory where ELISA commercial kits were used (Bethyl Laboratories) using purified IgG as a standard curve. The results were expressed in mg immunoglobulin/ml plasma. Statistical analyses were performed using the SAS version 9.00 (SAS Institute Inc., Cary, NC, USA) as described by Brujeni.

Analysing the body mass of the lambs in the three lots, it was found that there were no differences, although the lambs in G2 and G3 were heavier than the lambs in G1 on day 25 (15.75, 15.60, and 14.50 kg, p<0.05) and on day 30 (16.90, 17.00, and 15.25 kg, p <0.05). The values were similar to those obtained by Napolitano et al. (2002) in lambs raised separately from their mothers (they suffer greater stress during the weaning period).

As for the concentration of IgG, lambs in G1 and G3 showed slight decreases (p < 0.05) of plasma IgG. However, both groups showed an increase in values at the end of this period: 7.11 IgG/ml in G1 and 5.62 IgG/ml in G3 (p < 0.05). In contrast, values in G2 did not decrease, reaching the maximum value in 30 days. Regarding the differences between the groups, the lambs in G1 and G3 showed higher concentrations of IgG than the animals in G2 at the beginning of weaning (5.20, 2.10 and 5.61 mg/ml (p < 0.05), respectively. There are no differences between groups during the period after weaning. Reducing colostrum intake in G2 could cause an earlier synthesis of the IgG in comparison than in G1 and G3, as found by Nonnecke. This could explain the growth of the IgG in the lambs in G2 during this period.

• Material and method

The present study was conducted at the SCDCOC Caransebes on 45 lambs of the Țurcană breed with single gestation. All the lambs were born in the same period (February-March 2025). The health of the animals was monitored during the experiment and the lambs were healthy throughout the experimental period.

Upon calving, the animals were divided equally by sex and then divided randomly into three different groups. The natural growth group (G1) was composed of 15 lambs, which sucked colostrum directly from their mothers. The other two lots of 15 lambs were housed in separate pens, providing 0.4 m2 for each lamb and a heat source (infrared lamp) to ensure 20°C.

The lambs were fed from the bottle with a mixture of sheep colostrum, previously heated to 38°C. The artificially raised lambs received 150 g of colostrum equivalent to 4 g of IgG/kg upon calving (G2) or 200 g equivalent 8 g of IgG/kg (G3) distributed in three rations at 2, 14, and 24 h post-partum. The IgG concentrations in the colostrum (64.37 mg/ml) were determined in a laboratory based on an ELISA kit (Montgomery, TX, USA), using a purified IGG as a standard curve.

• Conclusions

The lambs that received an amount of colostrum equivalent to 8 g of IgG/kg body mass equally divided into three rations at 2, 14, and 24 h post-partum could reach similar IgG concentrations in the blood. At the end of the weaning at 60, 65, and 66 days post-partum, respectively, the lambs had a weight of 16.90, 17.00, and 15.25 kg, respectively. However, this study shows that not only the amount of colostrum but also the management during breast-feeding until weaning (the stress produced by the separation from the mother sheep), the quality of the milk, and the frequency of breastfeeding can affect the final immune status of the lambs. This study reveals important information about the amount of colostrum needed for newly born lambs under

